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March 19, 1997

Commissioner of Patents
Box Patent Application
Washington,D.C. 20231

Re: New Patent Application
APPLICANT: William George Wilhelm
FOR: HIGH EFFICIENCY LIGHTING SYSTEM

Dear Sir:

Enclosed please find specification, claims, abstract, drawings, declaration, verified statement (indep), verified statement (sm. business concern) and Certificate of Mailing.

Please deduct filing fee of $385.00 and 4 additional independent claims of $160.00 from my deposit account no. 23-0120. A duplicate of this transmittal is attached.Please also deduct $11.00 for one extra claim in excess of twenty. Please acknowledge receipt by returning the enclosed postcard.

Very truly yours,

Alfred M. Walker

Alfred M. Walker
AMW:jp
encl.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail #EM324241891US addressed to Commissioner of Patents, Box Patent Application, Washington, D.C. 20231, on the date indicated below.

Date: March 19, 1997

Joyce Peterson

Joyce Peterson

APPLICANT/PATENTEE: William George Wilhelm

SERIAL NO./PATENT NO.: To Be Assigned

FILED OR ISSUED: To Be Assigned

FOR: High Efficiency Lighting System

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) AND 1.27(b)) INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled **High Efficiency Lighting System** described in the specification filed herewith.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

FULL NAME: Nextek Power Systems, Inc.
ADDRESS: 1019 Montauk Highway Shirley, NY 11967
SMALL BUSINESS CONCERN

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in the loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

DATE: March 18 ,1997

William G. Wilhelm W.G.W. 3/18/97
William George Wilhelm

vstmtind:light

APPLICANT OR PATENTEE: William George Wilhelm

SERIAL OR PATENT NO.: To be assigned

FILED OR ISSUED: To be assigned

FOR: High Efficiency Lighting System

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) AND 1.27 (c)) SMALL BUSINESS CONCERN

I hereby declare that I am an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: Nextek Power Systems, Inc.
ADDRESS OF CONCERN: 1029 Montauk Highway, Shirley, NY 11967

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled **High Efficiency Lighting System** by inventor William George Wilhelm described in the specification filed herewith.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

NAME: NONE
ADDRESS:

(INDIVIDUAL) (SMALL BUSINESS CONCERN) (NONPROFIT ORGANIZ.)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: William George Wilhelm

TITLE OF PERSON OTHER THAN OWNER: Vice President.

ADDRESS OF PERSON SIGNING: 1029 Montauk Highway
Shirley, NY 11967

DATE: March 18, 1997

William George Wilhelm W.G.W.
3/18/97

vstmtco:light

HIGH EFFICIENCY LIGHTING SYSTEM

This application is a continuation-in-part of application Serial No. 08/606,219 filed March 7, 1996, which is a continuation-in-part of application Serial No. 08/328,574, filed October 24, 1994, now U.S. Patent no. 5,500,561 dated March 19, 1996, which was a continuation of application Serial No. 08/129,375, filed September 29, 1993, which is a continuation of application Serial No. 07/944,796, filed September 14, 1992, which is a continuation of application Serial No. 07/638,637, filed January 18, 1991.

BACKGROUND OF THE INVENTION

The field of the invention is high efficiency uninterruptable lighting systems.

Uninterruptable power supplies are well known accessories especially when applied to computer equipment to "ride out" brief power outages so that no data is lost or compromised. Some have more battery storage capability so that operation may be maintained for an extended outage. Some special lighting systems are also protected in a similar fashion by an uninterruptable power source for critical applications such as operating rooms in hospitals. In lieu of such systems, reduced amounts of auxiliary emergency lighting is provided for special areas by modular systems which are only engaged during power outages; these modules are often used in stairwells and consist of a housing enclosing a battery, charger, power sensor and one or two flood lamps.

These prior art systems do nothing to enhance lighting efficiency, and would not be considered as substitutes for conventional lighting.

OBJECTS OF THE INVENTION

It is an object of this invention to provide an uninterruptable lighting system that can be routinely substituted for conventional building or office lighting.

It is another object of this invention to provide high efficiency operation with lower operating cost than conventional incandescent and fluorescent lighting systems.

It is yet another object of this invention to provide long term uninterruptability (3 hours +) with small storage volumes.

It is an object of this invention to provide optimum battery management for long storage life, ultra low maintenance, and economical operation.

It is a further object of this invention to provide for economical connection to an alternate energy source such as a solar photovoltaic (PV) panel.

It is another object of this invention to provide a system with enhanced safety through low voltage operation between the power control unit and the lighting fixtures.

It is yet another object to achieve high power quality with low interference through very high power factor and low total harmonic distortion.

It is an object of this invention to provide for expansion of the lighting system through a modular approach to increase subsystem and component standardization to reduce cost.

SUMMARY OF THE INVENTION

In keeping with these objects and others which may become apparent, the present invention includes a high efficiency lighting system for maintaining normal lighting conditions by lighting fixtures requiring DC electrical power.

The system includes a power control means for receiving AC electrical power from a grid source and delivering required low voltage DC electrical power to the lighting fixtures. The power control means converts the AC electrical power to DC electrical power.

A battery provides, on a standby basis, the required DC low voltage electrical power to the power control means. The battery is connected to the power control means so that the battery may be maintained in a fully charged condition by the power control means during normal supply of AC electrical power from the grid source.

The power control means delivers required DC electrical power from the battery to the lighting fixtures during an AC electrical power outage to maintain the power without interruption.

The power control means can be a plurality of multiple power control means, each connected to its own battery for maintaining the lighting in a building with multiple rooms.

An optional photovoltaic source of DC electrical power may be connected to the power control means for reducing the amount of electrical power taken from said grid source.

The battery provides, on a standby basis, DC low voltage electrical power to the power control means, which power control means maintains the battery in a fully charged condition by electrical power from an AC grid source.

In a version using AC power input only without an auxiliary battery or photovoltaic panel, the high efficiency lighting system for maintaining normal lighting conditions of lighting fixtures requiring DC electrical power, includes the power control means for receiving AC electrical power from a grid source and

delivering required DC electrical power to the lighting fixtures, as well as a power control means converting AC electrical power to DC electrical power.

In a further embodiment for remote use, such as a remote campsite without access to conventional AC power, a high efficiency lighting system maintains normal lighting conditions of lighting fixtures requiring DC electrical power. The remote system includes a power control means for receiving DC electrical power from a photovoltaic panel and delivering required low voltage DC electrical power to the remote lighting fixtures, and the power control means controls charging of a battery.

The battery also provides, on a standby basis, the required DC low voltage electrical power to the power control means. It is connected to the power control means while being maintained in a charged condition by the power control means, during daylight hours of input of power from the photovoltaic panel.

Moreover, the power control means delivers required DC electrical power from the battery to the lighting fixtures during periods of time when power from the photovoltaic panel is not available, such as at night times.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention can best be understood in conjunction with the accompanying drawings, in which:

Figure 1 is a block diagram of basic uninterruptable lighting system;

Figure 2 is a physical block diagram of basic uninterruptable lighting system;

Figure 3 is a wiring layout of a single lighting module;

Figure 4 is a wiring layout of a four module system;

Figure 5 is a block diagram of lighting system with a PV panel;

Figure 6 is a front view of power control unit;

Figure 7 is a wiring diagram and specs for two lamp ballast;

Figure 8 is a wiring diagram and specs for single lamp ballast;

Figure 9 is a front view of battery enclosure; and

Figure 10 is a block diagram of power control unit.

Figure 11 is a block diagram of an alternate lighting system using natural gas cogeneration.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 shows a block diagram of the major components of an uninterruptable lighting system of this invention. It may be installed anywhere conventional building lighting is required. Unlike emergency lighting, this is a full service, high quality lighting product. It functions with standard fixtures and lamps, without compromise in output quality and with no flicker in the event of a power failure. This permits normal building activities to continue for several hours using battery storage without disruption of work activity due to loss of lighting. The key subsystem that ties the entire system together is the power control unit 1 which normally uses AC grid power to supply the lighting energy and keep the battery 2 charged. The lighting fixtures 3 are fluorescent tubes using electronic ballasts which have a low voltage (nominal 26.6 volts) DC input supplied by line 5 from power control unit (PCU) 1. During a power outage, the DC line 5 is supplied by battery 2.

Figure 2 shows a physical block diagram showing the AC electric service panel 6 with a three wire cable

system supplying either 120 or 220 VAC to PCU 1. Battery case 7 contains two group 24/27 deep discharge lead acid storage batteries wired in series and through a 30 amp fuse to the PCU 1. The wiring to all lighting fixtures 3 is at a nominal 26.6 volts DC. In the preferred embodiment, each PCU can power ten two tube 48 inch T8 fluorescent fixtures or 20 single tube fixtures.

Figure 3 shows a wiring layout for three offices as controlled by a single PCU 1. A closet area 17 is used to house battery 2. The AC line 4 leads to PCU I which is placed in the ceiling cavity. The DC wiring 5 to the lighting fixtures is also in the ceiling cavity.

The 220 VAC input power to the PCU is 725 watts for an AC rms of approximately 3 amps. The equivalent 120 VAC unit will be about 6 amps. Because the PCU is power factor corrected to .99, a 20 amp circuit breaker and number 12 wire can support a maximum of 3 PCU's from a 120 volt line and 6 units from a 220 volt line for a total DC power output of about 2100 watts and 4200 watts respectively.

Figure 4 shows a wiring layout serving 8 small offices and four larger ones. This involves the use of four separate uninterruptable lighting systems using four PCU's 1 and four battery modules 2 located in four central closets 17. The four PCU's are supplied from a single 220 VAC circuit breaker in power panel 6 via AC cable 4 as distributed from distribution box 20. Each of the lighting systems supplies 10 two lamp fixtures 3.

Figure 5 shows an uninterruptable lighting system including a PV panel 25.

As shown in Figure 6, a front view of PCU 1, it is simply wired to two terminals. This simple system configuration permits high security lighting using an AC line, battery back-up, and PV shared contribution.

A system with the PCU alone attached to the AC line is a viable lighting system that can pay for itself by providing high efficiency DC lighting. By adding the battery subsystem, the user achieves uninterruptable lighting. By using a system without a battery but with AC input and a PV panel, the power savings of the PV contribution is achieved with the balance supplied by the AC input. In an area remote from the AC grid, a system using a PCU attached to a large PV panel and a larger battery can supply totally solar lighting. The PCU is sufficiently flexible to support all of these configurations of lighting systems. It can also supply other DC loads besides lighting, such as for example, household appliances, microwave ovens, heaters and the like. Furthermore, it can also alternately accept external DC power from many varied sources such as wind generators or engine powered generators.

Figure 6 shows a front view of PCU 1 with finned heat sink 28 and terminal strip 29.

Figures 7 and 8 show the wiring diagrams and specifications for the two lamp and one lamp DC ballasts respectively (designated as NB2756/2 and NB2727M respectively).

Figure 9 shows a front view of the battery case with hinged lid 36 and latches 37. It is a thermoplastic case rated only for sealed type lead acid batteries.

Figure 10 shows a block diagram of the PCU. The AC input is rectified by DC Rectifier Means such as a bridge circuit. The Power Factor Correction Means is used to achieve a high power factor (.99) at the AC input. The Control Means and Voltage Regulator means interact through circuits such as pulse width modulation and DC to DC switching power supply topologies to provide the nominal 26.6 volts to the lighting ballasts or other suitable DC loads through

the power junction means. Other voltages are also possible, such as 13.3, 26.6, 39.9 etc.

The Battery Undervoltage Cut-Off disconnects the battery in situations of depletion to prevent "over sulfation" or chemical and physical damage to the storage battery. The PV Voltage Regulator and Suppressor is a power conditioner block to suppress voltage transients (such as from lightning strikes in the vicinity) and also to prevent over charging of the storage battery from the PV panel.

Figure 11 is an alternate embodiment for a loadside powered lighting system including natural gas in a cogeneration component. AC power 50 is normally converted to DC power by DC power converter 51 and control means 52. However, a cogenerator in the form of a DC gas generator 53 receives natural gas from a natural gas source 54, and sends DC power to building lighting system 55, such as electronic ballasted fluorescent lighting. This system provides a flatter and more predictable power demand for electric utility customers at building lighting system 55, since it supplants peak power from electric utility generating sources. This results in reduced demand charges, since gas offers a lower cost per unit of energy consumed, compared to conventional AC power from a public utility.

The cogeneration system can run continuously for lighting load 55, without having to be sent back to AC line power 50, which avoids the need for costly AC synchronization methods and sine wave purity, as is needed when sending excess electricity back to a public utility.

DC gas generator 53 directly couples to building lighting system 55 through a diode isolator that allows either AC or DC power to operate building lighting system 55.

Other modifications may be made to the present invention without departing from the scope of the invention, as noted in the appended claims.

I CLAIM:

1. A high efficiency lighting system for maintaining normal lighting conditions by lighting fixtures requiring DC electrical power comprising:

power control means for receiving AC electrical power from a grid source and delivering required low voltage DC electrical power to said lighting fixtures;

said power control means converting said AC electrical power to DC electrical power;

battery means for providing on a standby basis said required DC low voltage electrical power to said power control means;

said battery means being connected to said power control means for being maintained in a fully charged condition by said power control means during normal supply of AC electrical power from said grid source; and

said power control means delivering said required DC electrical power from said battery means to said lighting fixtures during an AC electrical power outage to maintain without interruption normal lighting by said lighting fixtures.

2. The high efficiency lighting system of Claim 1 having multiple power control means each connected to its own battery means for maintaining the lighting in a building with multiple rooms.

3. The high efficiency lighting system of Claim 1 having a photovoltaic source of DC electrical power connected to said power control means for reducing the amount of electrical power taken from said grid source.

4. A high efficiency lighting system for lighting fixtures requiring DC low voltage electrical power comprising:

power control means for receiving AC electrical power from a grid source and delivering required low voltage DC electrical power to said lighting fixtures;

said power control means converting said AC electrical power to DC electrical power;

photovoltaic means for delivering DC low voltage electrical power to said power control means;

said power control means reducing the electrical power taken from said grid source by the amount of electrical power supplied by said photovoltaic means.

5. The high efficiency lighting system of Claim 4 having battery means for providing on a standby basis said required DC low voltage electrical power to said power control means, said power control means maintaining said battery means in a fully charged condition by electrical power from said grid source, for maintaining without interruption the normal lighting by said lighting fixtures during a power outage.

6. A high efficiency lighting system for maintaining normal lighting conditions by lighting fixtures requiring DC electrical power comprising:

power control means for receiving AC electrical power from a grid source and delivering required low voltage DC electrical power to said lighting fixtures;

said power control means converting said AC electrical power to DC electrical power.

7. The high efficiency lighting system as in Claim 6, further comprising a DC power cogenerator directly coupled to said lighting fixtures through a diode isolator allowing either AC or DC power to operate said lighting fixtures.

8. A high efficiency lighting system for maintaining normal lighting conditions by lighting fixtures requiring DC electrical power comprising:

power control means for receiving DC electrical power from a photovoltaic panel and delivering required low voltage DC electrical power to said lighting fixtures;

said power control means controlling charging of a battery means;

said battery means providing on a standby basis said required DC low voltage electrical power to said power control means;

said battery means being connected to said power control means for being maintained in a charged condition by said power control means during hours of input from said photovoltaic panel, and

said power control means delivering said required DC electrical power from said battery means to said lighting fixtures during periods of time when power from said photovoltaic panel is not available.

9. A DC power supply system for DC loads requiring DC electrical power comprising:

power control means for receiving AC electrical power from a grid source and delivering required low voltage DC electrical power to said DC load;

said power control means converting said AC electrical power to DC electrical power;

battery means for providing on a standby basis said required DC low voltage electrical power to said power control means;

said battery means being connected to said power control means for being maintained in a fully charged condition by said power control means during normal supply of AC electrical power from said grid source; and

said power control means delivering said required DC electrical power from said battery means to said DC load during an AC electrical power outage to maintain without interruption normal operation of the DC load.

10. The DC power supply system of Claim 9 having a photovoltaic source of DC electrical power connected to said power control means for reducing the amount of electrical power taken from said grid source.

11. The DC power supply system of Claim 9 having a cogeneration source of DC electrical power connected to said power control means for reducing the amount of electrical power taken from said grid source.

12. A DC power supply for DC loads requiring DC electrical power comprising:

power control means for receiving AC electrical power from a grid source and delivering required low voltage DC electrical power to said DC load;

said power control means converting said AC electrical power to DC electrical power.

13. A DC power supply system for DC loads requiring DC electrical power comprising:

power control means for receiving DC electrical power from a DC power source and delivering required low voltage DC electrical power to said DC load;

said power control means controlling charging of a battery means;

said battery means providing on a standby basis said required DC low voltage electrical power to said power control means;

said battery means being connected to said power control means for being maintained in a charged condition by said power control means during hours of input from said DC power source, and

said power control means delivering said required DC electrical power from said battery means to said DC load during periods of time when power from said DC power supply is not available.

14. The DC power supply system as in Claim 13 wherein said DC power source is a cogeneration unit.

15. The DC power supply system as in Claim 13 wherein said DC power source is a photovoltaic panel.

16. The DC power supply system as in Claim 9 wherein said DC load is a household appliance.

17. The DC power supply system as in Claim 9 wherein said DC load is a microwave oven.

18. The DC power supply system as in Claim 9 wherein said DC load is a heater.

19. The DC power supply system as in Claim 13 wherein said DC load is a household appliance.

20. The DC power supply system as in Claim 13 wherein said DC load is a microwave oven.

21. The DC power supply system as in Claim 13 wherein said DC load is a heater.

ABSTRACT

A high efficiency lighting system maintains normal lighting conditions by lighting fixtures requiring DC electrical power. A power control device receives AC electrical power from a public utility converts AC power to DC power and delivers low voltage DC electrical power to lighting fixtures. A standby battery is provided to maintain power during power outages. Optionally, a photovoltaic DC electrical power source may be connected to the power control device, to provide alternate DC electrical power. In a further embodiment, a gas driven cogenerator unit may supply DC electrical power.

A:#a/lighting

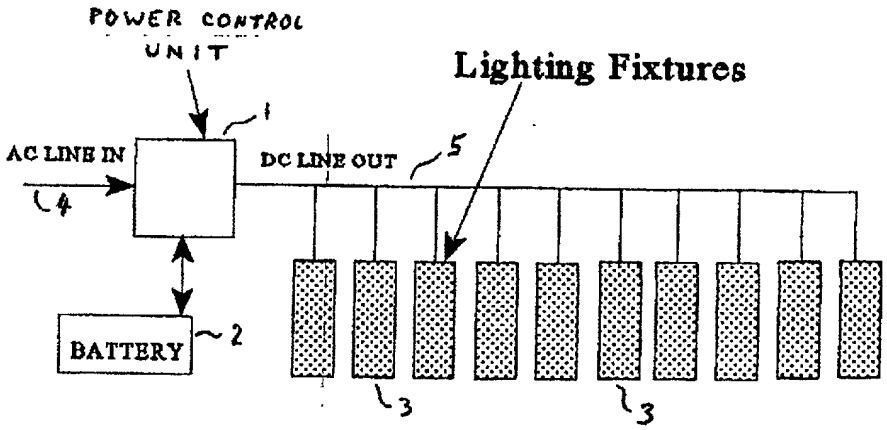

Figure 1.

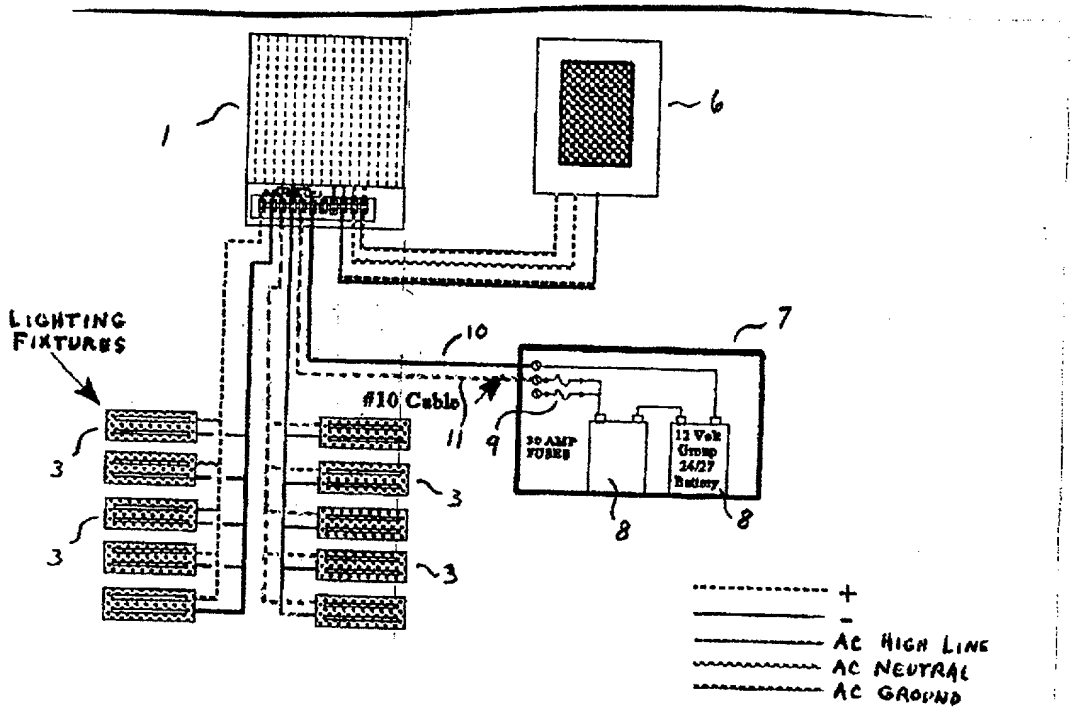

Figure 2.

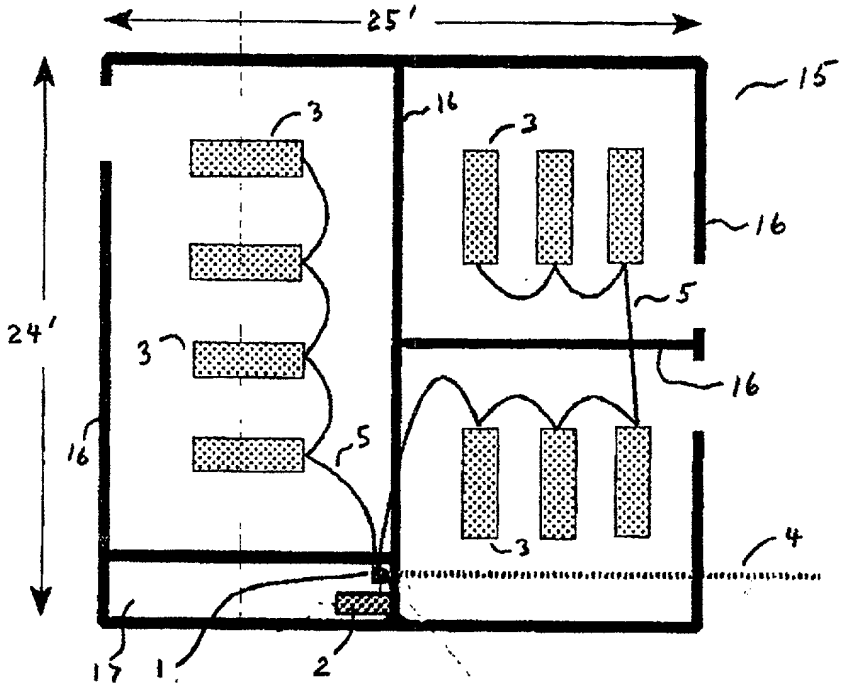

FIGURE 3

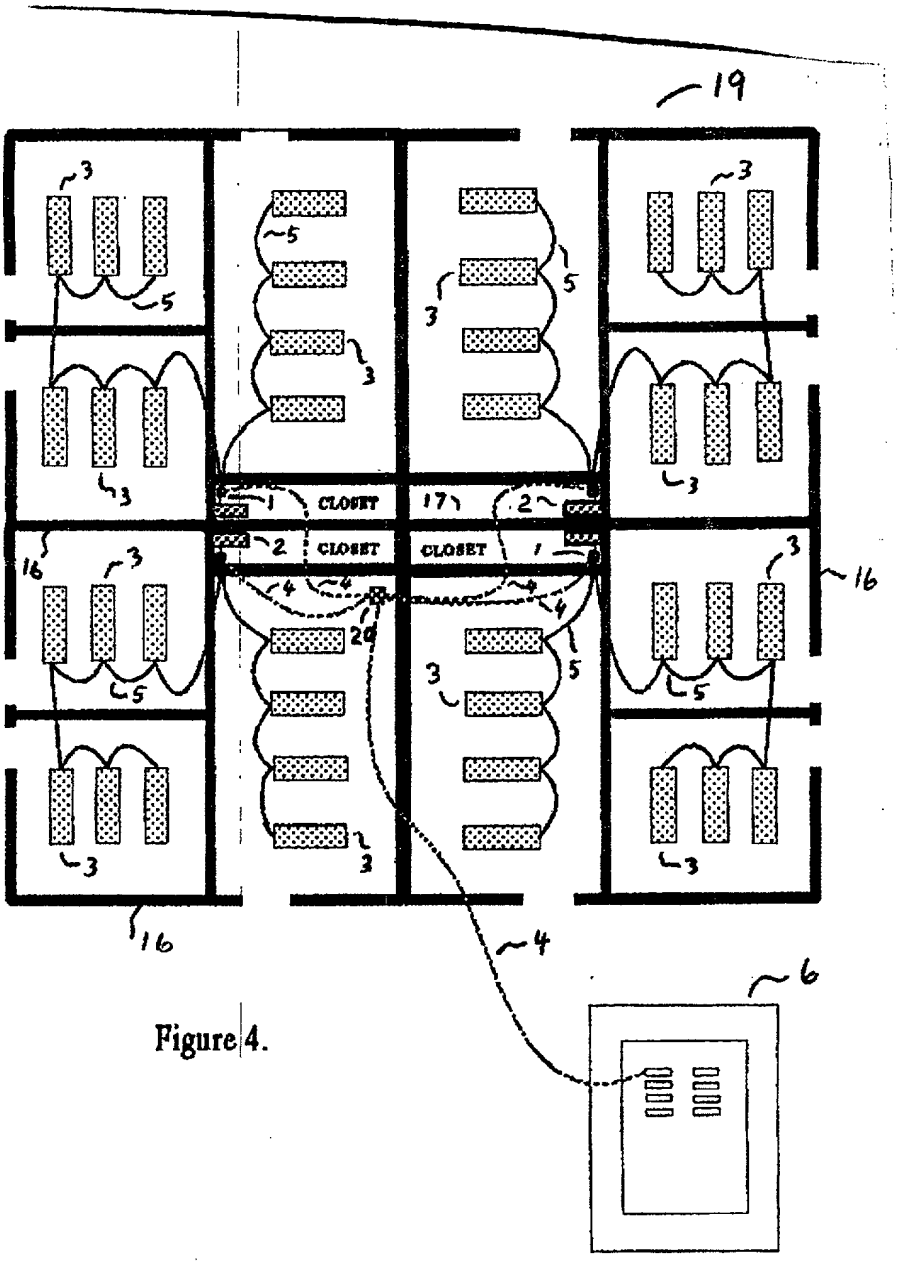

Figure 4.

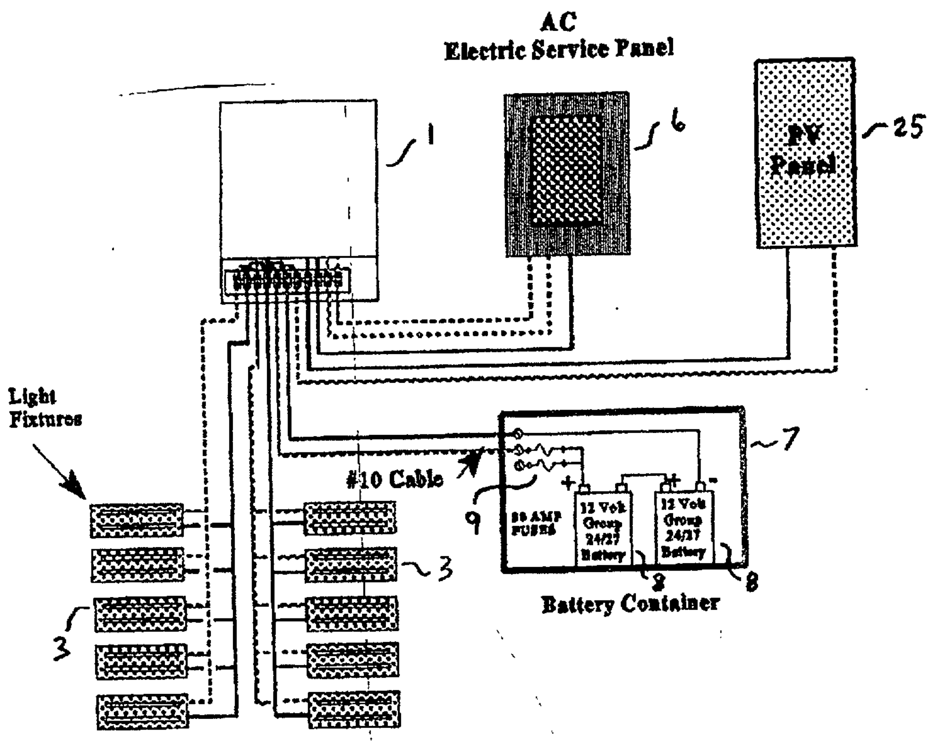

Figure 5.

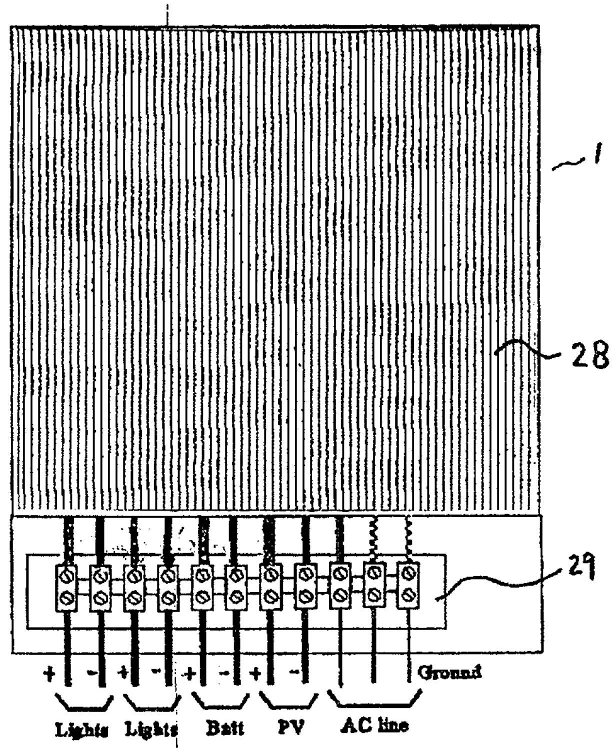

FIGURE 6

Lamp Type	Two 48 inch T8, nominal "32 Watt"
Operating voltage	26.6 Volts DC
Power Consumption	56 Watts
Operating Current	2 amp

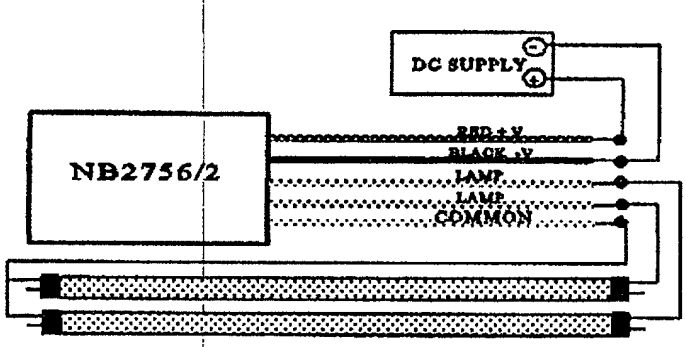

FIGURE 7

Lamp Type	48 inch T8, nominal 32 Watt
Operating voltage	26.6 Volts DC
Power Consumption	27 Watts
Operating Current	1 amp

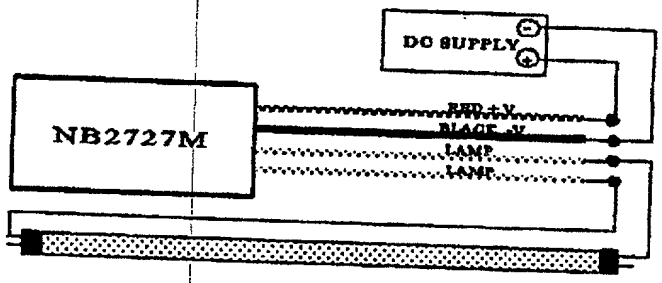

FIGURE 8

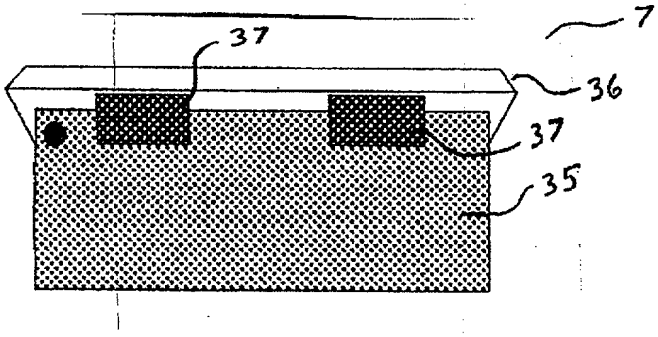

FIGURE 9

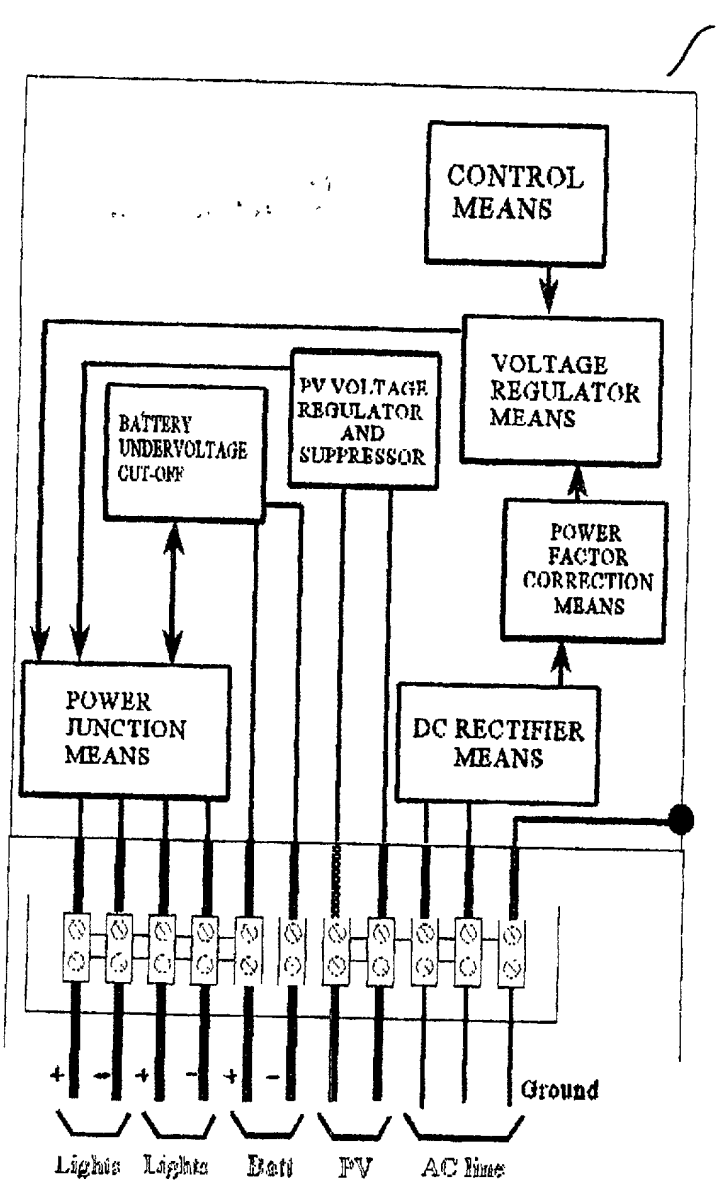
1
CONTROL MEANS
VOLTAGE REGULATOR MEANS
PV VOLTAGE REGULATOR AND SUPPRESSOR
BATTERY UNDERVOLTAGE CUT-OFF
POWER FACTOR CORRECTION MEANS
POWER JUNCTION MEANS
DC RECTIFIER MEANS
+
-
+
-
+
-
Ground
Lights
Lights
Batt
PV
AC line

FIGURE 10

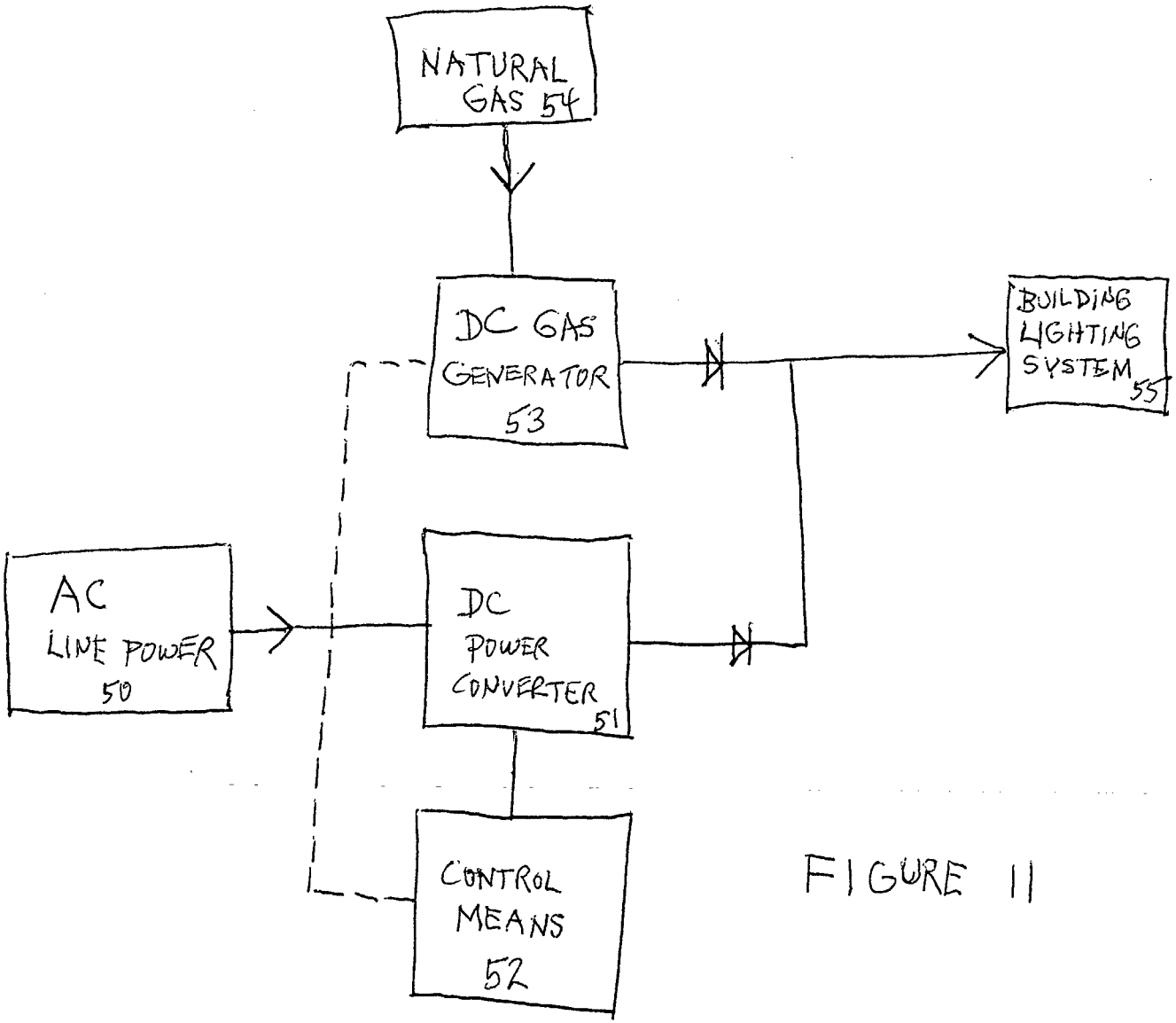
NATURAL GAS 54
DC GAS GENERATOR 53
BUILDING LIGHTING SYSTEM 55
AC LINE POWER 50
DC POWER CONVERTER 51
CONTROL MEANS 52

FIGURE 11

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **High Efficiency Lighting System**, the specification of which is attached hereto. I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Sec.d1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code, Sec. 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	(Yes)	(No)
None				

I hereby claim the benefit under Title 35, United States Code, Sec. 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code Sec.112. I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Sec. 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Serial No.	Filing Date	Status-Patented, Pend, Aban
08/606,219	3/7/96	Pending
08/328,574	10/24/94	Issued 3/19/96 Patent # 5500561
08/129,375	9/29/93	Abandoned
07/944,796	9/14/92	Abandoned
07/638,637	1/18/91	Abandoned

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: I hereby appoint as my attorney, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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W.G.W. 3/18/97

declarsole:light